Technology Opportunity

Three-Dimensional Laser Window Formation

The National Aeronautics and Space Administration (NASA) seeks to transfer the NASA-developed cost-saving process for forming flawless three-dimensional laser windows. These windows evolved from a need for nonintrusive optical systems to measure flow in turbines and compressors.

Potential Commercial Uses

- Three-dimensional laser windows for compressor and turbine facilities
- Nonintrusive optical flow measurement systems
- Optical viewports
- Optical filters
- Coexisting convergent-divergent lenses
- Optical heaters and shields

Benefits

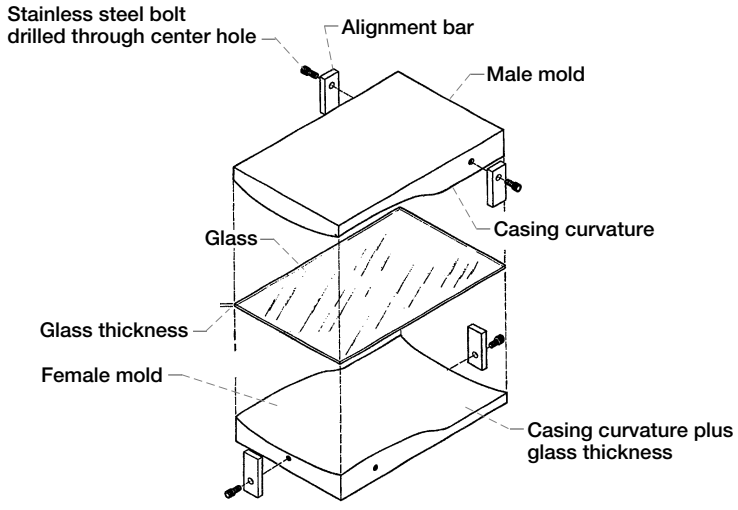
- Costs less because molds are used; not as labor-intensive as the grind-and-polish method
- Curvature of surfaces is extremely accurate; product is of superior quality

The Technology

An increase in fundamental research on turbines and compressors created a need for a nonintrusive optical system to measure flow. A key element in such a system is an optically clear laser window through which the laser, the laser beams, and reflected light pass. In response to this need, the NASA Lewis Research Center developed and implemented a unique process for forming flawless, contoured three-dimensional laser windows. The process is a unique methodology that encompasses design and selection criteria, glass formation, bonding media, and evaluation testing for the three-dimensional laser windows. Accurate tolerances and flawless quality are ensured.

Until this process was perfected, the grind-and-polish method was the only alternative. Grinding and polishing parallel surfaces to a high degree of accuracy is extremely difficult, labor intensive, and expensive. And grinding and polishing complex

Slumping Components Configuration



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surfaces is also extremely difficult, if not impossible. A typical ground and polished compound curvature window would cost the Government approximately $120,000 per plate, but would not match the quality of a window produced by this new process. A typical window produced by the NASA-developed process averages $2000 per plate—a cost saving to the Government of $118,000 per plate. Since Lewis produces approximately 12 plates per experiment and has averaged 4 experiments per year over the last 5 years, this window process has saved the Government more than $28 million in the last 5 years.

Options for Commercialization

No applicable patent; none being applied for. Seeking partnership with industry for nonaerospace applications.

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Key Words

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